Science Toolkit: Grade 5 Objective 1.B.1.a

Student Handout: Science: Grade 5 Objective 1.B.1.a

Standard 1.0 Skills and Processes

Topic B. Applying Evidence and Reasoning

Indicator 1. Seek better reasons for believing something than "Everybody knows that..." or "I just know" and discount such reasons when given by others.

Objective a. Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations.

Selected Response (SR) Item

Question

Use the passage 'Space Shuttle Re-entry' to answer the following question.

What is the primary source of friction on the space shuttle during re-entry?

A. the gravity of Earth
B. the pull of the moon
C. particles of pollution in the air
D. air molecules in the atmosphere

Correct Answer

D. air molecules in the atmosphere

Question

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Handouts

Space Shuttle Re-entry

The space shuttle program uses spaceships to carry humans from Earth to space and back again.

It takes a lot of fuel to produce the force needed to lift a space shuttle from Earth to space because the lift force must act against the force of gravity pulling down on the space shuttle. Much less fuel is needed to bring the space shuttle back to Earth. When the astronauts on a space shuttle complete a mission, they use the force of gravity acting on the space shuttle to pull it down from space to Earth's surface.

This landing process is not entirely without problems. Once the space shuttle moves from space into Earth's atmosphere, the space shuttle begins to hit air molecules. Although air is a gas, the space shuttle moves so quickly that it hits many air molecules with a great amount of force. Those hits result in friction with the air around the space shuttle. The friction slows the downward motion of the space shuttle and produces a large amount of heat.

Because of the heat produced, the space shuttle needs heat-resistant tiles so the inside of the space shuttle does not get too hot as it lands. The heat produced by the friction between the tiles and the atmosphere produces an orange glow as the shuttle moves toward Earth's surface.